before this society a few years ago, the differentiation sometimes cannot be made. Many cases show some sensory perversion, as Landry himself found in his original case.

Dr. Sinkler, in replying to Dr. Putnam's questions, said: There was no atrophy in his case, and there was no tenderness over the nerve trunks. The numbness of the extremities was an initial symptom and lasted but a few days. The loss of power was complete for about a week, and was quite gradual in its onset. It was about ten days before it was complete. Power returned, first in the upper extremities and lastly in the lower extremities. The only difference in the sensibility was that there was slight numbness in the fingers, but the sense of localization was good. The astereognosis to which Dr. Sinkler referred was only temporary. In regard to the treatment: The case was at first treated with aspirin and subsequently with bichloride of mercury in minute doses.

(*To be continued.*)

NEW YORK NEUROLOGICAL SOCIETY.

March 6, 1906.

The President, Dr. Joseph Fraenkel, in the Chair.

Demonstration of Neuro-Fibrils.—Dr. Edwin G. Zabriskie gave a demonstration of normal and pathological neuro-fibrils stained by the Cajal method. The speaker said that so far as his personal observation with this method of preparing the neuro-fibrils extended, it seemed to him absolutely inconclusive, and he did not believe that we were justified in making any positive assumption from it as to whether there were fibers coming from the terminal buttons which communicated with the intercellular fibers, as had been claimed.

Do Central Tracts of the Nervous System Regenerate?—Dr. L. Pierce Clark read a paper on this subject, in which he offered the following conclusions:

1. Animal experiments failed to provide conclusive data that central tracts of the nervous system ever regenerated, so that the former function was restored. In warm-blooded animals, and in the human species in particular, an abortive attempt on the part of the cord to regenerate was largely, if not solely, confined to fibers of undoubted peripheral type.
2. Histological analysis of cases of hemisection, compression paraplegia, myelitis, and like destructive lesions of the cord failed to show positive evidence that actual structural regeneration of axis cylinders ever occurred in the central nerve tracts of the human spinal cord. In case of complete division of the brain and spinal tracts, there was simply degeneration, followed by sclerosis.
3. A most acceptable reason for non-regeneration of such tracts was shown in that the component nerve fibers did not possess a neurilemma sheath, from which nerve regeneration mainly, if not solely, occurred. This lack in cord and brain tracts, in contrast to the regenerating peripheral nerves, was due possibly to a difference of embryological origin for the two structures of the nervous system.
4. The seven cases cited by Stewart and Hart for cord regeneration, being merely hemisections, either did not fulfill the conditions of tests, or the evidence for regeneration was not definite or convincing.
5. In cases of complete transverse division of the cord there was not sufficient justification, either from experimental or clinical data, to warrant suture of the spinal cord in an attempt to cure the defect.

Dr. Pearce Bailey said that at one of the recent meetings of the American Neurological Association, Dr. S. Weir Mitchell, in discussing the case of suture of the spinal cord reported by Stewart and Hart, had expressed considerable doubt in regard to it, and seemed inclined to believe that the cord had not been completely severed.

Most of the reported cases of hemisection of the cord were absolutely worthless as evidence, as in a large proportion of them there was no section of the cord at all; simply a stab-wound and the Brown Séquard syndrome, due probably to contusion. Dr. Bailey said that a number of years ago he saw a case of stab-wound of the spine, with complete Brown Séquard paralysis, which was followed by complete recovery in the course of three or four weeks. The case was evidently one of contusion or hemorrhage of the cord, but the cord was not divided.

Demonstration of Cases Illustrating Results of Peripheral Nerve Anastomosis.—By Dr. Alfred S. Taylor. The first case shown was one of Bell's palsy of twelve years' duration, which was operated on by Dr. Taylor on Jan. 7, 1905, the facial nerve being implanted laterally into the hypoglossal. The muscles, at the time of operation, were completely degenerated. Five months later there was practically no change in the patient's condition, with the exception of the fact that there was some improvement in the condition of the left eye, which had been the seat of extreme lacrymation and conjunctivitis. There was also a slight movement of the muscles of the chin in response to the electric current, and just a shade of motion upon the volition of the patient. Ten months after the operation there was distinct motion of the muscles about the chin and the corner of the mouth, which could be clearly demonstrated by the patient.

The second patient shown by Dr. Taylor was a boy, nine years old, who suffered from facial paralysis after a mastoid operation, which was performed on July 13, 1903. He was operated on by Dr. Taylor on Oct. 24, 1903, and during the twenty-eight months that had elapsed since that operation, there had been a decided improvement in his condition. The asymmetry of the face at rest had disappeared; he had a considerable amount of control of the muscles, and was able to wink the affected eye.

In this case, Dr. Taylor said, the seventh nerve was implanted laterally into the twelfth. The speaker said he had now performed this operation in eight cases, and in all of them where sufficient time had elapsed, positive results had been obtained.

Dr. Taylor next showed a number of cases of brachial birth palsies which he had seen in consultation with Drs. L. Pierce Clark and T. P. Prout. In these cases the damaged section of the nerve was excised, and an end-to-end suture made. The lesion in all these cases was practically the same, and was the result of over-stretching of the nerve roots in the brachial plexus, which led to tearing of the nerve sheaths and fibers, and perhaps to hemorrhages within the nerve sheaths. The ultimate result of such a lesion was the formation of cicatricial tissue, so that the nerve impulses could not pass through the nerve roots, resulting in paralysis of certain groups of muscles. If these palsies were allowed to continue for too long a period of time, the paralyzed muscles would undergo contracture, and even the bones would become changed in their conformation, and produce certain well recognized deformities which it would be practically impossible to overcome, even after the nerve was repaired.

The first case of birth palsy shown by Dr. Taylor was that of a girl, with complete paralysis of the left upper extremity. The operation was done on June 8, 1905, when the child was one year old. The deep cervical fascia was found to be much thickened and adherent, and on exposing the brachial plexus, it was found to consist of one large cicatricial mass extending to the spinal foramina and underneath the clavicle.

As it was found impossible to recognize the individual nerves in this mass of cicatricial tissue the mass itself was excised as a whole, leaving a gap two centimetres long, which was bridged over with loops of chromicized catgut wrapped with Cargile membrane, the idea being to form an artificial canal through which the nerve fibers could regenerate.

About nine months had elapsed since the operation, and the only improvement noted thus far was a certain degree of motion in the muscles about the shoulder joint.

The next case was that of a boy, ten years old, with a birth palsy of the left upper extremity, who was operated on March 14, 1905. Upon exposing the brachial plexus, the fifth and sixth cervical and the suprascapular nerves were found bound down by adhesions and thickened fascia. The proximal end of the suprascapular was tortuous and thinned. After resecting the thickened fascia, the proximal end of the suprascapular nerve was resected and implanted into the root of the fifth cervical.

The boy now had a fairly wide range of motion, but the affected arm was very much smaller than its fellow, and somewhat deformed, as evidenced by the peculiar flexed position of the elbow, with some inward rotation.

Dr. Taylor showed a number of photographs of this case, illustrating the limitations of motion that had existed prior to the operation. The improvement that had resulted from the operation he attributed largely to the removal of the thickened cervical fascia by which the nerve had been bound down. There had certainly been a considerable gain in the range of motion and in the development of the musculature.

Dr. Taylor also reported a case of anterior poliomyelitis, with complete paralysis of the forearm and hand, in which there was a slight return of power after division of the eighth cervical and first dorsal nerve roots, and their implantation into the fifth and sixth cervical.

Dr. L. Pierce Clark, who was associated with Dr. Taylor in these neuro-surgical studies, said that he had treated five cases of infantile cerebral hemiplegia to overcome the extensor muscle weakness in this type of palsy. In all the cases there was extreme foot deformity and spastic contracture. The effort was made to improve the paralyzed extensors (peroneal group) by implanting those nerve bundles of the external popliteal nerve which supplied this group into the internal popliteal nerve. The operation was done just above and posterior to the bend of the knee, at the bifurcation of the sciatic into the internal and external popliteal. The work on all five cases was done about one year ago. But little improvement was to be seen in four of the cases; the fifth, however, a boy twelve years old, had showed marked improvement. The foot had changed from a talipes equinus to that of valgus, or flat foot. There was now nearly as much power in the external peroneal group as in the internal. The patient still had the hemiplegic type of gait, which was slowly being trained away. If this peculiarity of gait could be overcome, the speaker thought we might say there was a reversal of motor centers in the cortex, a question first raised by Kennedy.

Dr. William M. Leszynsky said that in the first case shown by Taylor, that of Bell's palsy of twelve years' standing, he thought it was a question whether the woman would have preferred to go through life with the face distorted on the paralyzed side as the result of secondary contracture, or as she was at the present time. The speaker said he could not imagine a worse condition than in the case shown, so far as the cosmetic result was concerned. The patient still had her lagophthalmus, with complete flaccidity of the left side of the face and apparent atrophy of the muscles. The movements on that side of the face were apparently transmitted through the action of the masseter. The pronounced facial atrophy in this case was an unusual feature, and for this reason the outlook was not very encouraging. Of course, no one could predict the ultimate outcome of the operation.

Dr. J. Ramsay Hunt said it was an interesting question whether there could be a restoration of function in muscles that had been paralyzed for twelve years. In the case shown by Dr. Taylor there was apparently slight motion about the angle of the mouth on the paralyzed side, and in that connection the speaker called attention to the fact that the facial innervation overlapped somewhat, so that in the event of paralysis on one side of the face, there would still remain a few muscular fibers which received their nerve stimulus from the opposite side. This might possibly be the explanation of the apparent restoration of function about the mouth in this particular case, the muscular tissue having received trophic stimuli from the opposite side, and had not degenerated. The speaker said he did not expect that the improvement would extend any further, as two years and eight months had already elapsed. If the operation described by Dr. Taylor proved successful it would certainly be of great value in old cases where there was drooling and inability to close the eye, even if the restoration of function was only partial.

In cases of birth palsy, Dr. Hunt questioned the propriety of excising so much of the thickened and fibrous plexus that the cut ends of the nerves could not be brought into opposition, and trusting to an artificial medium to bridge over the gap between the divided plexus trunks. He did not consider that connective tissue offered an insuperable obstacle to nerve regeneration, as it was nature's method of repairing divided nerves, and he thought that more conservative surgical measures would offer a better chance of ultimate restoration of function.

Dr. J. F. Terriberry said his service at the Hospital for Ruptured and Crippled Children afforded him a large experience in cases of birth palsy of the upper extremities, and the point he wished to emphasize was the uncertainty of the prognosis. He recalled a number of cases in which the result was better than the operative result in any of the patients shown by Dr. Taylor. One of his cases, a child of thirteen years, with the Erb type of paralysis, had been under observation since her second year, and although the affected muscles had grown to fair size, and responded to the faradic current, there was very poor extension of the forearm, supination, and extension of the wrist. These facts had led him to carefully observe this case, and he had found that attempts to use the weakened muscles were accompanied by diffusion of energy throughout the arm, the weakened muscles being overpowered by their healthy antagonists. As this paralysis occurred at a time when many of the function groupings were not learned, it occurred to him that that fact probably accounted for the wide diffusion of energy upon attempts at using the weak muscles. Acting upon that supposition he attempted to educate these muscles to their particular work, and with most gratifying results. In the past four months that case had made more progress than had been obtained after a number of years of electricity, massage and general instruction to use the arm as much as possible. It was remarkable to observe how the energy, at first widely distributed over the arm muscles, had become localized, so that the child was now able to almost perfectly functionate the weakened muscles, unhampered by their healthy opponents.

As to operating on this class of cases, Dr. Terriberry said it might be well to do so, but the operation should not be undertaken too early, because in many instances there was marked improvement even after one, two or three years had elapsed. The internal rotation of the arm, which was very marked in one of the cases shown, was usually the first symptom to disappear.

Dr. Terriberry said that Dr. Taylor's results in the cases of palsy of the face were certainly remarkable, and the final result would be extremely interesting.

Dr. Smith Ely Jelliffe said he had seen all the cases shown by Dr. Taylor, some of them both before and after the operation, and from his own observation he could say that almost without exception they had distinctly improved. How much of the improvement was due to the operation, and how much to the incessant efforts that had been made to educate and train the impaired muscles, he was unable to say. He was inclined to feel, however, that we are justified in believing that a residual amount of good has been gained by the operative procedure in these cases, and even assuming that this was not so, we have still gained an enormous amount of information in reference to the technique of the operation, which will undoubtedly prove valuable in the future.

Dr. Arthur C. Brush, of Brooklyn, N. Y., said he was inclined to believe, with others, that the majority of cases of infantile paralysis recovered, or nearly so, in the course of time. He had been able to trace quite a large number of cases that had been more or less directly under his own observation, and in one instance only, that of a boy of twenty, was there still great loss of function in the paralyzed arm. Nearly all of them still showed some loss of power, but it was usually very slight. In the cases shown by Dr. Taylor, the operative procedure undoubtedly hastened the progress of the cure, which was more rapid than it would have been if electricity and manipulation had been solely relied on.

Dr. L. Pierce Clark said in reply to the suggestion made by Dr. Hunt that the restoration of function about the angle of the mouth in his case operated upon by Dr. Taylor, and shown this evening, was due to an overlapping innervation from the opposite side, he said the facial nerve on the right side had had an opportunity for over twelve years to take up this function, and had not done so. Why should motion return promptly at the end of the fifth month after facio-hypoglossal anastomosis if there was not a regeneration of the left facial nerve over the hypoglossal union? Prior to that operation, every possible medical means had been employed to restore function, but without the slightest result. He thought there could be no question that at present the hypoglossal nerve was transmitting nerve impulses into the muscle nerve endings of the facial to the left side. The woman had been told by him repeatedly before operation that electrical responses indicated that all the muscles above the left angle of the mouth were degenerated, and that probably in case of a successful issue of the operation she could only expect motion in the muscles at and below the left angle of the mouth. He thought that promise was now near fulfilment. Probably, as was well known, and as Dr. Hunt had remarked, the reason why atrophy in the muscles about the left side of the mouth had not occurred to any great extent was due to the slight trophic influence of the overlapping facial nerve of the opposite side.

In discussing the series of cases of brachial birth palsy which he and Dr. Taylor had been interested in, Dr. Clark thought it was very unlikely that the nerves would ever worm their way through the dense scar tissue, as suggested by Dr. Hunt. Careful study of a very large number of these cases had never shown the slightest evidence that this sort of repair was taking place; on the contrary, in many cases an actual recoil of the new nerve fibers from the scar obstacle had been shown by Dr. Prout.

The statement that the prognosis of brachial birth palsy was usually favorable was entirely at variance with his personal observation and literature research. Non-recovery was placed as high as 70 or 80 per cent. by Bruns. Obstetricians, who saw all the cases, agreed with neurologists in giving an unfavorable prognosis. While the good effects of a more or less constant training which these operated cases had received was somewhat of a rebuke to the pessimistic neurologist, yet the speaker did not believe the improvement in the cases could by any means be attributed to this training solely.

Dr. T. P. Prout said that in speaking of the recovery of these cases it was well to bear in mind the nature of the lesion we were dealing with. When we considered the fact that this scar tissue had been produced in the nerve trunk, it was impossible to conceive how complete recovery could take place. The scar tissue was the direct result of the severing of the sheath of the nerve and hemorrhage into the nerve itself, which subsequently became organized and produced scar tissue. The only way by which we could hope for ultimate recovery was to remove the scar tissue. This would at least relieve the pressure, which was one of the factors that prevented the nerve from regenerating.

Dr. Edward D. Fisher said that while it was of not infrequent occurrence, especially in dispensary practice, to see cases of birth palsy improve with little or no treatment after two or three years, those were evidently not the kind of cases that had been reported by Drs. Clark and Taylor. In those cases, no doubt, long-continued treatment by manipulation and electricity had been tried without success. Cases of birth palsy could be practically divided into two classes; namely, those that would recover with little or no treatment, and those that would fail to improve in spite of faithful and long-continued treatment.

In referring to the cases of facial paralysis, Dr. Fisher said that no one could demonstrate that the muscles on the affected side had absolutely disappeared throughout their entire structure, or that their innervation was entirely cut off. If any muscular fibers still remained, whether the paralysis had lasted for five years, or for twelve years or longer, there was a possibility of regeneration of the muscle if the nerve force was restored. If it could be actually demonstrated that all the muscular fibers had disappeared then these operations could be of no avail.

The President, Dr. Fraenkel, said the most important point at issue seemed to be whether any muscular tissue was left, and this was difficult to determine. The speaker said he agreed with what had been said in regard to the circular muscles of the mouth being innervated from both sides, and in the case shown by Dr. Taylor he did not think the fact had been demonstrated beyond doubt that the operation had resulted in a reawakening or regeneration of the orbicularis oris on the affected side.

Dr. Taylor, in closing, said that as a surgeon he was interested to learn how little faith the neurologist had in nerves. In the first case of facial paralysis, to which Dr. Leszynsky had alluded, the condition had lasted twelve years, and the operation had been done only fourteen months ago, and still there were evidences of some return of power. Even in the most favorable cases, no improvement was looked for in less than six months. Cases were on record where there had been a restoration of muscular power after thirty years. About a year ago, Dr. Charles A. Elsberg showed a case of facial paralysis of over twenty-nine years' standing in which there was some return of power after an anastomosis of the facial and spinal accessory nerves. In that case, the improvement was noticed within six or eight months after the operation. The case was an unusually favorable one, as the patient was a woman of means, and had submitted to continuous massage and electrical treatments, thus maintaining the trophic condition of the muscles on the affected side.

Dr. Taylor said that the mere fact of the absence of electrical reaction did not demonstrate that there was no muscular tissue left. The insertion of the electric needle through the skin and fat tissue sometimes produced a reaction when the usual methods failed to cause any response. When even a small nest-egg of muscle was left, it might be increased by the proper stimuli. In his own case, the patient was certainly very well pleased with the result thus far obtained, and more was hoped for in the future.

In alluding to the statement made by Dr. Hunt that the formation of a cicatrix in the brachial plexus was nature's way of healing the breach in the nerves, Dr. Taylor wondered that nature's method was not more successful. In the orthopedic hospitals and dispensaries it was of daily occurrence to see children ranging in age from four to twelve years, with extremities that were practically useless from this disability. If, therefore, the percentage of spontaneous cures was as high as some of the speakers had mentioned, then the number of original cases must be very great.

A *Case for Diagnosis.*—Presented by Dr. William B. Noyes. The patient was a man, aged forty-nine, a painter by occupation, who had a fairly definite history of syphilis, but denied alcoholic excess. In 1872 he received a stab-wound in the left arm, causing a permanent ulnar paralysis. In September, 1905, while working near a third rail he received a strong shock of electricity, which prostrated him for some days. He noticed, after this, rapidly increasing paralysis of the muscles of his arms, which soon made it impossible to work. More careful investigation proved that he had been growing weak in his left arm for at least two years, and that his right arm for the past year had been causing him constant pain and weakness in the region of the shoulder. Examination showed that he had marked atrophy of the muscles of the shoulder and arm, a loss of faradic reaction, especially marked over the right deltoid, pectoralis major, and the extensors and flexors of the right arm, with weakness of the left deltoid, and absolute paralysis of the left ulnar group of muscles. There was also a reduction of galvanic reaction, rather than a definite reaction of degeneration. There were fibrillary twitchings. Sensation was normal to touch, pin-prick, heat and cold. After two months' treatment, the weakness of the muscles of both arms, shoulders and hands increased so that he became helpless. The knee jerks became increased, and a definite Babinski reflex was present. Pain in the arms and shoulders was present at times.

The original diagnosis was progressive muscular atrophy, of spinal origin. The old ulnar paralysis was an independent lesion, and was due to a cut. The case had advanced while under observation, until now a diagnosis of amyotrophic lateral sclerosis was possible. It indicated the progression of cases of chronic or progressive anterior poliomyelitis, with involvement of the pyramidal tracts, the process descending the cord instead of ascending. It also indicated that amyotrophic lateral sclerosis was simply a stage in progressive muscular atrophy.

The shock of electricity hastened, but did not cause the disease. The real cause was to be looked for in the syphilitic or lead poisoning, or both.

Dr. Terriberry thought the case was possibly one of lead infection.

PHILADELPHIA NEUROLOGICAL SOCIETY.

December 18, 1905.

The President, Dr. Joseph Sailer, in the Chair.

Dr. Clifford B. Farr exhibited, by invitation, a case of bilateral cervical rib, with symptoms of pressure on the left brachial plexus.

Dr. M. H. Bochroch reported a case of apoplexy, with convulsions confined to the non-paralyzed side.

Dr. C. D. Camp read, for himself and Dr. C. W. Burr, a paper on "Multiple Sarcomata of the Brain and Cord."

Note on the Occurrence of the Gordon Reflex in a Case of Localized Pachymeningitis Hemorrhagica.—Dr. Dercum detailed briefly the following case: J. P. Age thirty-five. Suffered from frontal headache and marked somnolence. In the course of four or five days a transient ptosis of the right eyelid and dilatation of the right pupil made their appearance. At the same time it was observed that the left knee jerk was exaggerated, and that a distinct Babinski sign could be elicited upon the same side. The Babinski sign, though present, was not typical. On the other hand, the Gordon reflex, which was elicited by deep pressure made over the gastrocnemius at its passage into the tendon, was not only present, but was very pronounced. It was elicited with very great readiness. The patient not improving, but becoming more somnolent and stuporous, an operation was decided upon, a large osteoplastic flap being made over the right frontal region by Dr. W. W. Keen. As soon as the skull was opened, a large quantity of cerebrospinal fluid, containing some clots, escaped. Drainage having been established, the flap was replaced. On coming out of the anesthetic, the patient was conscious with complete lucidity and